



NATO Link 16 Iceland Air Defense System

IADS Communications

01 August 2000

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Outline




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- **Inter-site communications**
- **Local area networks**
- **Wide area network**
- **GAG voice communications**
- **Communications Control and Management**
- **CI-13 Remote Rekey System**

- **Note: Diagrams of the CRC architecture are intended as a general depiction. Similar communications capabilities exist at the ISSF & RRH sites, but are not shown.**



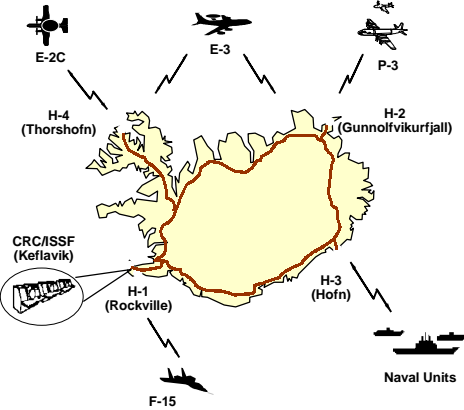
Inter-site Communications




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Description:


- Two separate Government-provided communications media:
 - Fiber optic network
 - PTI microwave
- Circuits available for Link 16 voice & data on each media:
 - CRC to H-1: Four 64 kbps channels
 - CRC to H-2: Four 64 kbps channels
 - CRC to H-3: Four 64 kbps channels
 - CRC to H-4: Four 64 kbps channels
- Circuits available for Link 16 data on local fiber optic media:
 - CRC to ISSF: Two 64 kbps channels



3



Local Area Networks



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Data Processing

Central Processors

Communications Data Processors (CDPs)

Existing data links

Dual Communications LAN

Network Control

CCC

SMT

Remote Rekeying

CI-13 MCU

Operations

Voice communications

Dual Display LAN

Universal Consoles

Communications and Encryption

Encryption

WAN Router (2)

KG-84 (8)

RRH comm. control

To CRC comm equipment

Alarm & Monitor & Device Servers

MAAP



CI-13 Multiplex & Encryption

Ground-Air-Ground Voice Switch & Encryption

Transmission & Distribution Equipment

To radar sites & base communications via fiber optic networks

4





Local Area Networks

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- Dual communications LAN
 - Provides inter-processor data communications
- Dual display LAN
 - Provides display data between Central Processors and Universal Consoles
- LAN technology
 - Ethernet (IEEE 802.3) using thickwire and thin coax media

5



Wide Area Network*

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Data Processing

Central Processors

Communications Data Processors (CDPs)

Existing data links

Communications LAN

Network Control

CCC

SMT

Remote Rekeying

CI-13 MCU

Operations

Voice communications

Display LAN

Universal Consoles

Communications and Encryption

Encryption

WAN Router (2)

KG-84 (8)

RRH comm. control

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CI-13 Multiplex & Encryption


Ground-Air-Ground Voice Switch & Encryption

Transmission & Distribution Equipment


To radar sites & base communications via fiber optic networks

*This wide area network is only shown as an example and cannot be used for Link 16 purposes

6




Wide Area Network




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- Provided for control and monitoring of RRH communications assets
- DEC WAN Router 250
- Transmission security provided by KG-84C
- This WAN is not available for Link 16 due to expansion and performance concerns

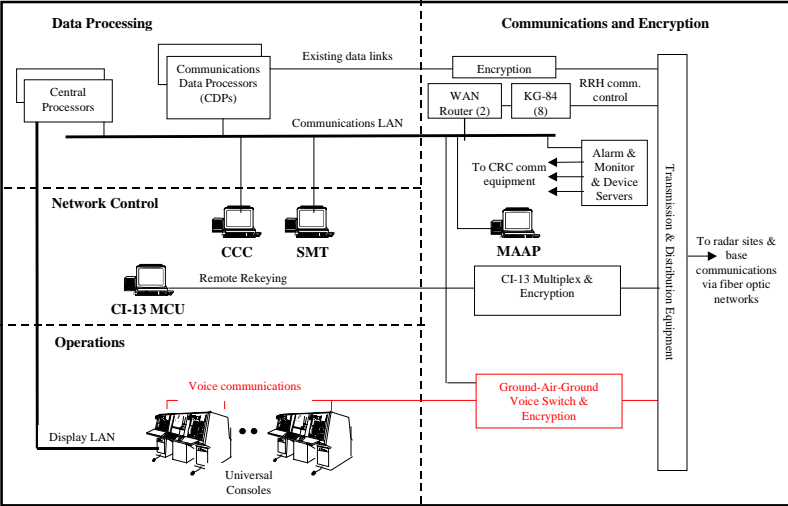
7



GAG Voice Communications



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The diagram illustrates the GAG Voice Communications architecture, divided into two main functional areas: Data Processing and Communications and Encryption.


Data Processing:

- Central Processors:** Connected to Communications Data Processors (CDPs) via Existing data links.
- Communications LAN:** Connects CDPs to Network Control and Operations.
- Network Control:** Includes CCC, SMT, Remote Rekeying, and CI-13 MCU.
- Operations:** Includes Universal Consoles connected via a Display LAN.


Communications and Encryption:

- WAN Router (2):** Connects to the Communications LAN and provides RRH comm. control.
- Encryption:** Utilizes KG-84 (8) for secure transmission.
- MAAP:** (Mission Assurance and Alerting Protocol) connects to the WAN Router and provides Alarm & Monitor & Device Servers.
- CI-13 Multiplex & Encryption:** Connects to the WAN Router and provides Ground-Air-Ground Voice Switch & Encryption.
- Transmission & Distribution Equipment:** Connects to the WAN Router and provides To radar sites & base communications via fiber optic networks.

8




GAG Voice Communications




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- Current GAG voice communications is provided through UHF/VHF radios
- Access to voice channels is provided through the GAG Switching System (Denro model 400D) and UC Communications Panels
- Control and monitoring of GAG voice is performed at CCM positions (CCC, SMT, MAAPs)

9



Communications Control and Management (CCM)



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Central Processors

Communications Data Processors (CDPs)

Existing data links

Communications LAN

Network Control

CCC

SMT

Remote Rekeying

CI-13 MCU

Operations

Voice communications

Display LAN

Universal Consoles

WAN Router (2)

Encryption

KG-84 (8)

RRH comm. control

To CRC comm equipment

Alarm & Monitor & Device Servers

MAAP

CI-13 Multiplex & Encryption

Ground-Air-Ground Voice Switch & Encryption


Transmission & Distribution Equipment

To radar sites & base communications via fiber optic networks


10

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Page 5




Communications Control and Management (CCM)




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- Centralized control and management of all IADS communications assets is performed by CCM function
- Communications Control Console (CCC) manages radios, data links, connectivity, timing, and cryptos
- Switch Maintenance Terminal (SMT) manages all switching system resources
- Maintenance and Administrative Position (MAAP) provides off-line switch maintenance

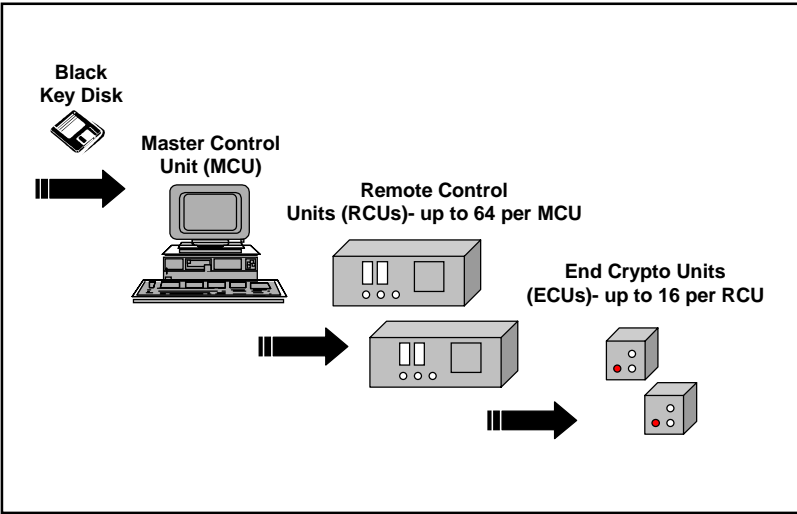
11



CI-13 Remote Rekey



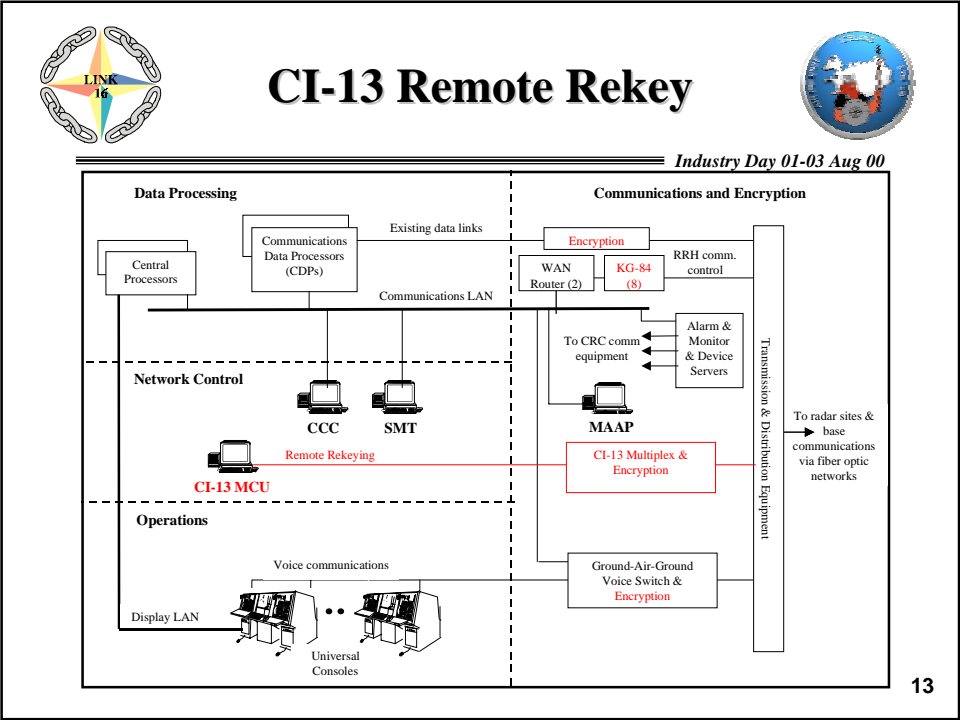
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The diagram illustrates the CI-13 Remote Rekey process flow:


- A **Black Key Disk** is inserted into the **Master Control Unit (MCU)**, represented by a computer monitor and keyboard.
- The MCU is connected to **Remote Control Units (RCUs)**, shown as rack-mounted hardware. The text indicates "up to 64 per MCU".
- The RCUs are connected to **End Crypto Units (ECUs)**, also shown as rack-mounted hardware. The text indicates "up to 16 per RCU".
- Arrows indicate the data flow from the MCU to the RCUs, and then from the RCUs to the ECUs.

12



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CI-13 Remote Rekey



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- Provides the ability to remotely fill cryptos with encryption keys
 - Also monitors crypto status and logs events
 - System includes:
 - Master Control Unit (MCU) and one backup at the CRC
 - Remote Control Units (RCUs) in crypto vaults at all IADS sites
- 14